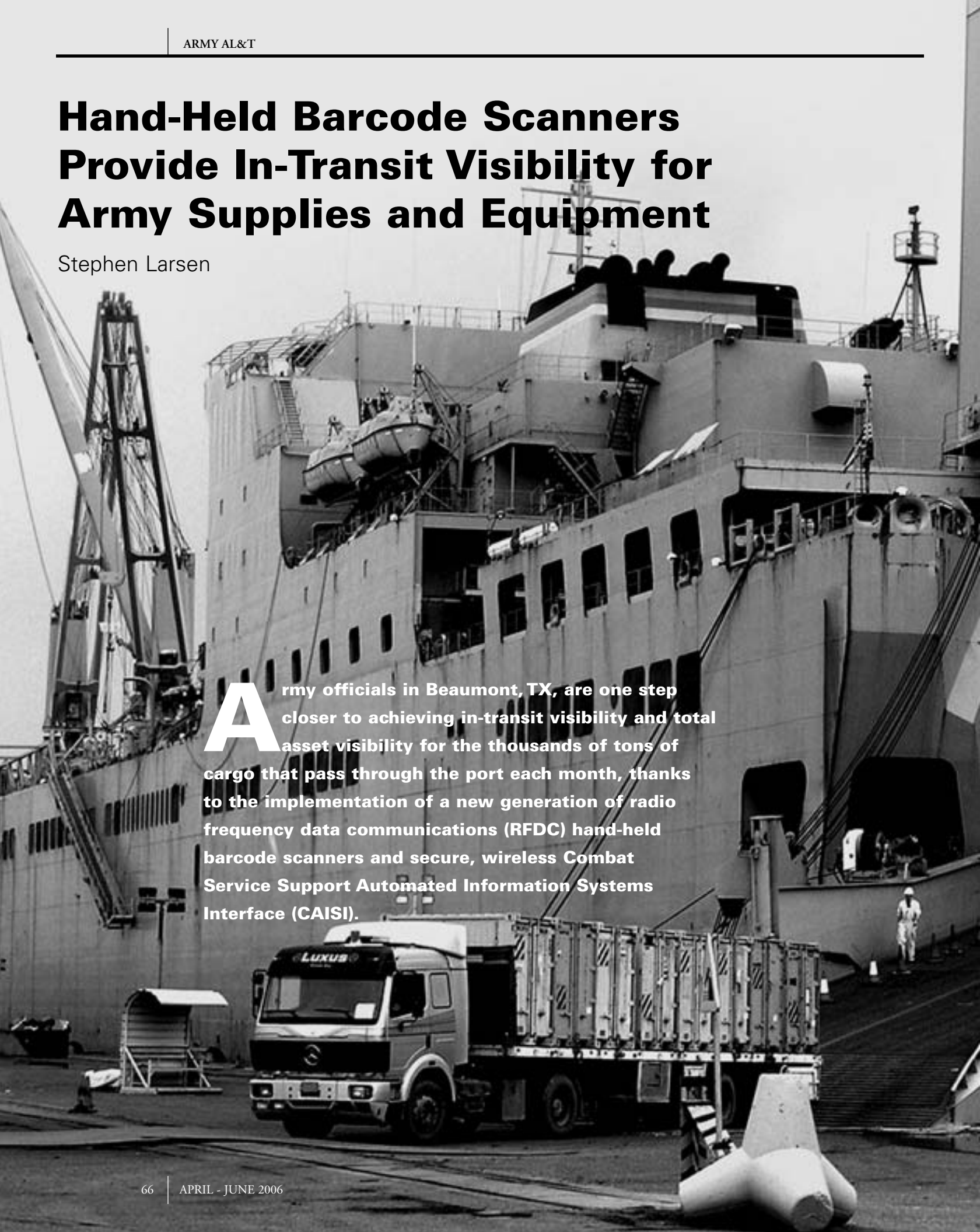
Hand-Held Barcode Scanners Provide In-Transit Visibility for Army Supplies and Equipment

Stephen Larsen



Army officials in Beaumont, TX, are one step closer to achieving in-transit visibility and total asset visibility for the thousands of tons of cargo that pass through the port each month, thanks to the implementation of a new generation of radio frequency data communications (RFDC) hand-held barcode scanners and secure, wireless Combat Service Support Automated Information Systems Interface (CAISI).

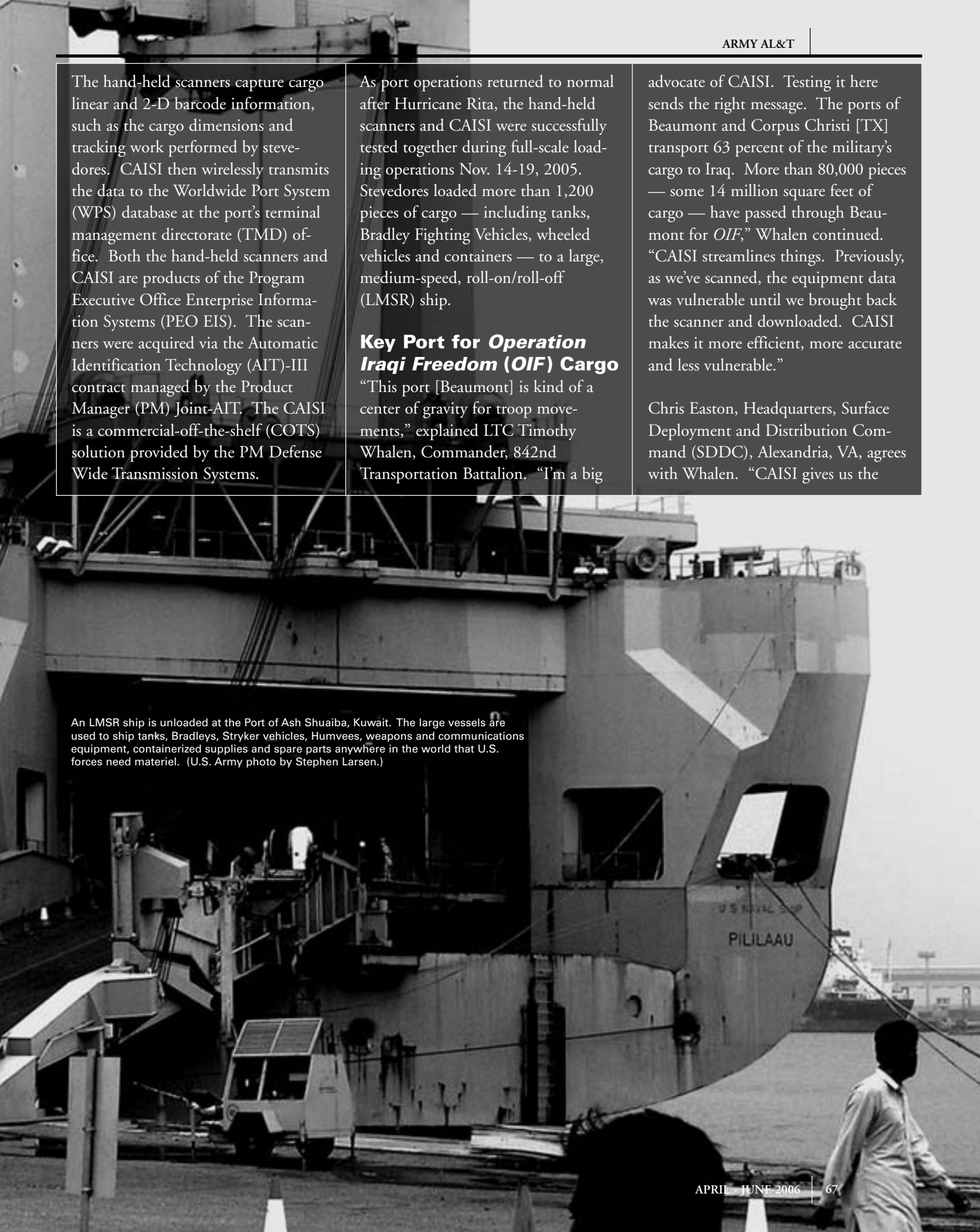
The hand-held scanners capture cargo linear and 2-D barcode information, such as the cargo dimensions and tracking work performed by stevedores. CAISI then wirelessly transmits the data to the Worldwide Port System (WPS) database at the port's terminal management directorate (TMD) office. Both the hand-held scanners and CAISI are products of the Program Executive Office Enterprise Information Systems (PEO EIS). The scanners were acquired via the Automatic Identification Technology (AIT)-III contract managed by the Product Manager (PM) Joint-AIT. The CAISI is a commercial-off-the-shelf (COTS) solution provided by the PM Defense Wide Transmission Systems.

As port operations returned to normal after Hurricane Rita, the hand-held scanners and CAISI were successfully tested together during full-scale loading operations Nov. 14-19, 2005. Stevedores loaded more than 1,200 pieces of cargo — including tanks, Bradley Fighting Vehicles, wheeled vehicles and containers — to a large, medium-speed, roll-on/roll-off (LMSR) ship.

Key Port for *Operation Iraqi Freedom* (*OIF*) Cargo

"This port [Beaumont] is kind of a center of gravity for troop movements," explained LTC Timothy Whalen, Commander, 842nd Transportation Battalion. "I'm a big advocate of CAISI. Testing it here sends the right message. The ports of Beaumont and Corpus Christi [TX] transport 63 percent of the military's cargo to Iraq. More than 80,000 pieces — some 14 million square feet of cargo — have passed through Beaumont for *OIF*," Whalen continued. "CAISI streamlines things. Previously, as we've scanned, the equipment data was vulnerable until we brought back the scanner and downloaded. CAISI makes it more efficient, more accurate and less vulnerable."

Chris Easton, Headquarters, Surface Deployment and Distribution Command (SDDC), Alexandria, VA, agrees with Whalen. "CAISI gives us the



An LMSR ship is unloaded at the Port of Ash Shuaiba, Kuwait. The large vessels are used to ship tanks, Bradleys, Stryker vehicles, Humvees, weapons and communications equipment, containerized supplies and spare parts anywhere in the world that U.S. forces need materiel. (U.S. Army photo by Stephen Larsen.)

ability to talk live to the WPS database from the cargo instead of having to wait four to five hours until we get the scanner back to download at the TMD office. The real key is to allow the scanner to solve problems at the cargo, rather than going back to TMD, and CAISI gives us the wireless 'bubble' that allows us to do that. The SDDC's goal is to increase the efficiency of data capture and data quality assurance processes, with an eye toward reducing manual effort," Easton added.

CAISI Wireless Fidelity (WiFi) Network

The Port of Beaumont implementation includes one CAISI Bridge Module (CBM), at the TMD office, and 16 CAISI Repeater Modules (CRMs), mounted on poles throughout the port in small weather-tight boxes called National Electrical Manufacturers Association (NEMA) enclosures.

According to Brad Amon, U.S. Army Information Systems Engineering Command Lead Systems Engineer for the CAISI program, CAISI offers a flexible configuration with multiple paths for redundancy. "When one radio link is blocked or interfered with, CAISI radios create a self-healing meshed network. When one path to the root is down, the other radios automatically repeat for each other to form an alternate path to the root."

CAISI implementation at the Port of Beaumont includes 16 CRMs (inset), which are mounted on poles throughout the port in small weather-tight boxes called NEMA enclosures. The CRMs help maximize WiFi coverage throughout the port. (U.S. Army photos by Stephen Larsen.)

Easton said the CRM coverage allows stevedores to transmit data from hand-held scanners to the WPS database from nearly anywhere throughout the port's 50-plus acres, except from inside vessel holds, which is why the hand-held scanners can do both batch and real-time downloading of cargo data.

Another challenge is the industrial nature of the water port. "Look around," Easton said, in a staging area filled with tanks, Bradleys and other vehicles. "Our cargo is very large and forms 'canyons of steel,' with walls made of multiple corner reflectors. Sometimes down these canyons, we may lose coverage. Part of the job is to solve as many problems as we can here at the cargo, without putting it in the 'frustrate yard,' which costs dollars."

SDDC's Chris Easton (left), observes a stevedore using a new RFDC hand-held barcode scanner to scan the information from a vehicle in the hold of a ship. The hand-held scanners and secure, wireless CAISI were successfully tested together during full-scale loading operations at the port Nov. 14-19, 2005. (U.S. Army photo by Stephen Larsen.)

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At the TMD office, Traffic Management Specialist Kyle Lee opened a hatch list on his computer that shows, for each hold section of a cargo ship, a description of the items stowed, their volume and weight, the consignee of each, and the total volume and weight of materiel in the hold. Lee gave the CAISI/hand-held scanners tandem a thumbs-up, noting that it was the first test, and SDDC personnel would have a better feel for what the system could do with additional missions under their belts.

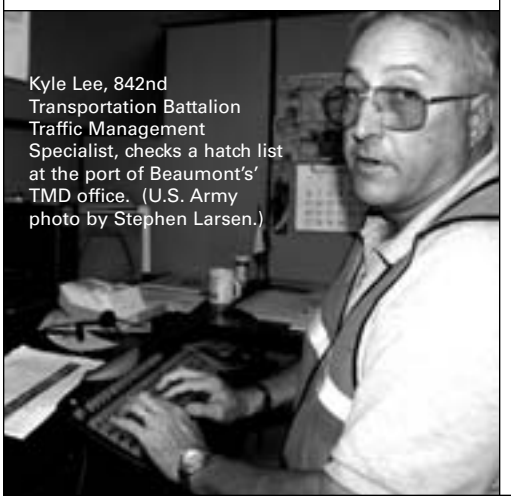
"So far, I am satisfied that these scanners will provide a real-time numbers update to WPS," Lee remarked. "I see an added advantage for our vessels section (stow planners) in that they can pull updates from WPS into the Integrated Computerized Deployment System more quickly. This allows them to stow the vessel as the mission progresses. The real-time updates at least provide an opportunity for us to stay even with the operation, if not actually work ahead. I think we have a good thing going here."

Gloria Barnes, WPS Administrator, gave her impression of CAISI. "I love it. We don't have to upload scanners,

Stevedores drive medical vehicles onto a ship during full-scale operations at the port of Beaumont Nov. 14-19, 2005. (U.S. Army photo by Stephen Larsen.)

so we have more real-time data. Before, we would see near-real-time data because we would upload the scanners a couple times a day. CAISI is better for stow planners and better for staging. It makes manifesting easier, reconciling easier — it makes everything easier. It also gives better in-transit visibility, even down to stow locations on a ship or staging locations on the port."

The SDDC selected CAISI in large part because it enables a WiFi capability in a port setting. This is a critical first step toward building a Battle Command Sustainment Support System (BCS3)-based 'digital dashboard,' which is the vision of SDDC Commander MG Charles Fletcher. "He envisions the logistician should see things as the warfighter does. He calls it his BCS3-based dashboard," said Whalen.



Kyle Lee, 842nd Transportation Battalion Traffic Management Specialist, checks a hatch list at the port of Beaumont's' TMD office. (U.S. Army photo by Stephen Larsen.)

The dashboard would allow logisticians at every step along the way to "drill down" at their laptop computer and see where pieces of cargo are in the supply chain. This would be possible with the near-real-time wireless exchange of data with WPS that CAISI allows, and would provide port commanders with more timely information about an exercise's progress. "I shouldn't need to wait until it gets to Beaumont to see a piece of equipment in the supply chain," explained Whalen. "I should see it in Fort Hood, TX, and all the way through the system. I don't want the warfighter in Fort Hood to have to worry about it — he has other things to worry about, like fighting battles. Right now, we have liaisons from Fort Hood here watching over things. We could avoid them feeling they have to be here if we could provide them the confidence of knowing where their materiel is."

CAISI — A Standard, Accredited Army System

Army officials saw several advantages to the CAISI solution versus other COTS solutions, starting with cost. The cost of the current implementation at Beaumont was $55,000 — less than a third of what other commercial alternatives would have cost. "CAISI is very cost-effective compared to other means to get this done at Beaumont," Whalen reflected. "We get a lot of bang for our buck."

Another major benefit is that CAISI is a standard, accredited Army system. "It's a big advantage for the SDDC that the support infrastructure for CAISI is already in place," said Easton. "Also, compatibility with existing Army infrastructure is assured both now and into the future, and host-nation approvals for these radios and frequencies are already in place with major U.S. allies." Another plus, Easton added, was the CAISI support team. "I spent some time in Kuwait and had an opportunity to meet several of the CAISI field service engineers. I found them to be both knowledgeable and proactive."

"We're sustaining the war now as opposed to surging," Whalen concluded. "With what we send over there currently, it's absolutely critical that we see these items as they go because there's very little redundancy in the Army right now. CAISI facilitates us seeing this very critical cargo."

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